Abstract No.37

Thermal inactivation and conformational lock of carbonic anhydrase

L. Alaei[a,], M. Amani[b] and A. A. Moosavi-Movahedi[a]*

[a] Institute of Biochemistry & Biophysics, University of Tehran, Tehran, Iran
[b] Medical University of Ardebil, Ardebil, Iran
(E-mail: Alaie@ibb.ut.ac.ir)

Carbonic Anhydrase is an enzyme that assists inter-conversion of carbon dioxide and water into carbonic acid, protons and bicarbonate ions. Zinc is the key to this enzyme reaction. The water bound to the zinc ion is broken down to a proton and hydroxyl ion. Zinc is a positively charged ion; it stabilizes the negatively charged hydroxyl ion so that it is ready to attack the carbon dioxide. Since this enzyme produces and uses protons and bicarbonate ions, it plays a key role in the regulation of pH and fluid balance in different parts of body. Carbonic Anhydrase isozymes perform different functions at their specific locations, and their absence or malfunction can lead to diseased states, ranging from the loss of acid production in the stomach, kidney failure and glaucoma. Blocking this enzyme shifts the fluid balance in the eyes of the patient to reduce fluid buildup, thereby relieving pressure. Inhibitors of carbonic Anhydrase are being used to treat glaucoma via enzyme activity inhibition. In this report, the enzyme activity was measured based on p-nitrophenol formation. Optimum activities were achieved at pH 6.8. Thermal inactivation temperature and kinetic parameters such as K_m, k_{cat},V_{max} and k_{cat}/K_m(enzyme efficiency) was obtained by UV-Vis spectrophotometer .The size of the enzyme was compared by dynamic light scattering (DLS) for native and inactive states. In this work, we report the structural information such as the number of interactions between subunits, kinetic parameters, enzyme efficiency as well as the size of carbonic Anhydrase in two states of native and inactive forms.

Key words: Carbonic Anhydrase, Conformational lock, Thermal inactivation, Subunits, Number of interactions, Dynamic light scattering.

Abstract No.38

Time dependency of heme degradation for endogenous glycated hemoglobin

M. Goodarzi[a,], A. A. Saboury[a], M. Habibi-Rezaei[b], and A. A. Moosavi-Movahedi[a]*

[a] Institute of Biochemistry and Biophysics, University of Tehran, Tehran, Iran
[b] School of Biology, University of Tehran, Tehran, Iran
(E-mail: m.goodarzi@ibb.ut.ac.ir)

Glycation is a cascade of nonenzymatic reaction, which leads to the biomacromolecular modifications. This reaction occurs in intracellular or extracellular spaces at hyperglycemic conditions because of covalent attachment between two groups: 1) aldehyde or keton group of open ring sugar and 2) amino group of long live proteins. These modifications do not only affect on protein structural properties but also change its functional characteristics. In diabetic patients, fructose level increases significantly in the red blood cells so that hemoglobin is a suitable target for such modifications which is called hemoglobin fructation. In this study, we investigate heme degradation of fructated hemoglobin in physiological condition by fluorescence technique at different time intervals. The results show the time dependency of heme degradation occurred for fructated hemoglobin as a sigmoidal pattern. As a matter of fact, the heme destruction can affect oxygen transportation in diabetic patients as the most critical index of hemoglobin function.

Key words: Fructation, Time dependency, Diabetes, Heme degradation.

Abstract No.39

Immobilization of glucose oxidase on modified magnetic nanoparticles

M. Abbasi[*], A. K. Bordbar, E. Ranjbakhsh and A. R. Khosropour

Department of Chemistry, University of Isfahan, Isfahan, Iran
(E-mail: bordbar@chem.ui.ac.ir)

Magnetic nanoparticles due to their magnetic properties, have recently received considerable attention in various fields of biotechnology and medicine. Enzymes and proteins have been immobilized on magnetic nanoparticles for cell separation and purification, drug delivery,